

Assessing the Landscape of Pediatric Respiratory Disease: A Retrospective Community-Driven Analysis

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A B S T R A C T

Background: Children's health and healthcare systems are heavily burdened by pediatric respiratory illnesses worldwide. Comprehending the frequency and trends of these ailments is crucial for efficacious public health initiatives.

Objective: Objective of the present study was to determining the trends and prevalence of respiratory infections in pediatric patients was the main goal of this study.

Methodology: This two-year retrospective observational study was conducted to investigate the respiratory illnesses in children aged 6 months to 10 years. Data collection employed a specialized Performa focused on medical records, ensuring accurate information. Statistical analysis was performed using SPSS version 27, included quantitative measures of mean and standard deviation, as well as qualitative assessments of frequencies and percentages, and chi-square tests.

Results: The demographic and socioeconomic analysis of 22,374 pediatric patients at Swat Medical College Emergency Department showed a mean age of 7.29 years, with 49.26% (n=11023) of the patients being male and 50.74% (n=11351) being female. Pneumonia was the most common respiratory illness (n=8342; 37.3%), with viral URTI (n=4669; 20.9%) and bronchiolitis (n=4328; 19.3%) following closely behind. Notably, 13% (n=2908) of patients were treated and released from the outside station, 15% (n=3356) got care in the resuscitation chamber, and 72% (n=16110) of patients received care inside. The Chi-Square statistic of 210.00 with a p-value of 0.2344 and 196 degrees of freedom indicates no significant association between the disease and the frequency of occurrence.

Conclusion: The majority of respiratory illnesses need indoor care, and pneumonia remains the leading cause of pediatric visits. This underscores the need for more emergency treatment facilities.

Keywords: Pediatric Respiratory Diseases; Retrospective Analysis; Pneumonia; Community Health.

Introduction

Pediatric respiratory disorders pose significant challenges to children's health worldwide and place substantial burdens on healthcare systems. This issue is a prominent public health concern due to its prevalence and impact on young individuals.^{1,2} Effective prevention, diagnosis, and treatment strategies rely on a comprehensive understanding of the prevalence and patterns of respiratory disorders in pediatric patients. Such knowledge allows healthcare providers to tailor interventions to the specific needs of affected children, ultimately improving health outcomes and reducing the strain on healthcare resources.³⁻⁵

The spectrum of children's respiratory diseases encompasses a wide range of conditions, ranging from common viral infections to chronic disorders like cystic fibrosis and asthma.⁶ These conditions vary in severity, duration, and treatment requirements, making the pediatric respiratory landscape diverse and complex. Factors contributing to this diversity include socioeconomic status, access to healthcare services, and environmental influences.^{7,8} Communities may experience differing frequencies and distributions of respiratory illnesses due to these variables, highlighting the need for tailored approaches to address specific regional challenges.

The socioeconomic status of families plays a significant role in shaping the prevalence and management of pediatric respiratory disorders. Access to healthcare services, including preventive measures and specialized treatments, is often limited for economically disadvantaged communities, exacerbating the burden of respiratory illnesses.^{9,10} Additionally, environmental factors such as air pollution, allergen exposure, and overcrowded living conditions can increase the risk of respiratory infections and exacerbations, particularly in

low-income areas. Understanding these social determinants of health is essential for developing targeted interventions to address disparities and improve overall respiratory health outcomes among children.^{11,12}

In order to evaluate the landscape of pediatric respiratory disorders and shed light on the complex mechanisms that contribute to their occurrence, this project intends to perform a thorough retrospective community-driven investigation. By carefully examining past medical records and community health data, the main goal of this study was to identify the trends and prevalence of respiratory disorders among pediatric patients. This research aims to close the gap between clinical knowledge and community-specific variables that influence the incidence of juvenile respiratory illnesses by using a community-driven approach. The results of this research will add to the body of information already in existence and provide the groundwork for the creation of evidence-based treatments and policies that will lessen the prevalence and consequences of juvenile respiratory disorders in a variety of settings.

Pediatric respiratory illnesses constitute a significant burden on children's health and healthcare systems globally. Understanding the prevalence and trends of these illnesses is crucial for designing effective public health interventions.

Objective

The objectives of this study are to identify prevalent trends in respiratory infections among pediatric patients at Swat Medical College Emergency Department, analyze demographic and socioeconomic characteristics of affected children, and gain insights into patterns of disease occurrence across different groups, including seasonal variations and environmental factors.

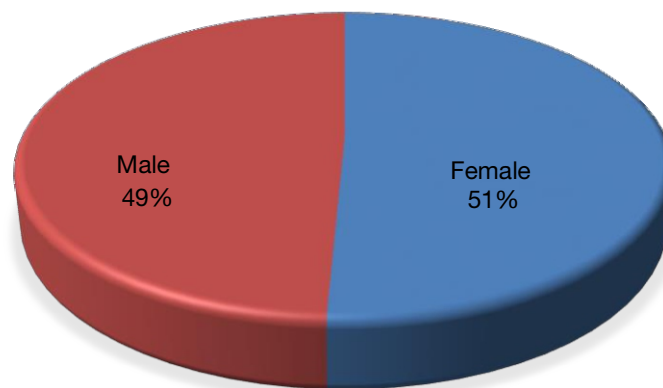


Figure 1. Gender distribution of the Study Population

Methodology

The Swat Medical College Emergency Department hosted the retrospective observational research from January 2019 to August 2021. This particular time period was carefully chosen to provide a thorough picture of pediatric respiratory diseases and to shed light on the trends and frequencies that are common in this vulnerable group.

A standardized pre-designed Performa was meticulously filled out based on the medical records of patients seeking treatment at the Emergency Department in order to gather thorough patient information. This meticulous methodology guaranteed the methodical gathering of

pertinent information for an exhaustive examination.

Children between the ages of six months and ten years who attended the emergency room and were diagnosed with any respiratory disease were included in the research group. In order to concentrate on the sensitive juvenile group most prone to respiratory problems, this age range was purposefully selected. In order to create a more homogenous cohort, exclusion criteria were used to weed out children who had congenital heart disease or other concomitant diseases that would complicate the main goal of evaluating respiratory infections.

SPSS version 27.0 was used for data input throughout the data management process, allowing for the organized and methodical examination of the gathered

Table 1. Demographic and Socioeconomic Characteristics of the Study Population

Variable	Frequency (n)	Percentage %
Age (Mean \pm S.D)	7.29 \pm 3.45	
Weight (Kg) (Mean \pm S.D)	20.95 \pm 7.91	
Family Education		
Illiterate	10121	45.24
Primary	2895	12.94
Matric	3879	17.33
Graduate	5479	17.33
Family Occupation		
Business	1468	6.56
Private Job	3885	17.37
Government Servant	680	3.03
Retired/ Jobless	796	3.56
Skill Worker	5098	22.79
Unskilled	10447	46.69
Family Income		
Between 35000	13876	62.01
Between 35000 – 50000	7294	32.60
Above 50,000	1204	5.39

data. By calculating percentages and frequencies, qualitative factors were evaluated and provided information on how categorical data was distributed. Mean and standard deviation computations were used to analyze the quantitative variables, giving rise to a quantitative picture of the dataset's primary trends and variances.

Results

During the study period, a total of 22,374 patients sought medical attention at the Emergency Department. Of them, 50.74% (n=11351) were female and 49.26% (n=11023)

male (figure 1). The patients were 7.29 years old on average and 20.95 kg on average in weight. Among parents, a considerable percentage (n=10121; 45.24%) had no formal education. Furthermore, the lower-income category, which was classified as those making up to Rs. 35,000 per month, comprised 62.01% (n=13876) of the participants. Unskilled workers made up about half of the population (n = 10447; 46.69%) (Table 1).

The majority of patients (n = 16110; 72%) received treatment in an indoor setting, 15% (n = 3356) received care in a resuscitation setting, and 13% (n = 2908) received care and were released from an outdoor station (figure 2).

Table 2. Epidemiology of Diseases in the Study Population

Disease	Frequency	Percentage
Pneumothorax	41	0.2
Otitis media	154	0.7
Earache	83	0.4
Stridor	207	0.9
Pharyngitis	1305	5.8
Acute Asthma	498	2.2
Tonsillitis	946	4.2
Croup	167	0.7
Status asthmaniasis	178	0.8
Pleural Effusion	187	0.8
Wheezy child	1178	5.3
Viral URTI	4669	20.9
Foreign body	91	0.4
Bronchiolitis	4328	19.3
Pneumonia	8342	37.3
Chi-Square Statistic	210.00	
p-value	0.2344	
Degrees of Freedom	196	

Discussion

This retrospective community-driven study at the Emergency Department provides valuable insights into pediatric respiratory illnesses. Aiming to identify disease trends and frequencies among children ages 6 months to 10 years, the study highlighted the need for targeted public health interventions by demonstrating the diverse demographic and socioeconomic backgrounds of patients seeking emergency care. Notably, pneumonia emerged as the most prevalent respiratory illness among children under 12 years old, underscoring its continued significance in pediatric health.¹³

In impoverished nations like Pakistan, respiratory infections precede 25–45% of outpatient visits and

15–25% of pediatric hospitalizations.¹⁴ Pneumonia continued to be the most common cause of respiratory diseases reported to the NICH emergency room in our sample (n=8342; 37.3%). A research done in Kolkata, India indicated a similar incidence of pneumonia (29%), whereas a study conducted in Zia Uddin University Hospital in Karachi found that 38.93% of hospitalized children had respiratory disorders.^{15,16} Additionally, a significant factor in pediatric hospitalization, death, and morbidity is viral respiratory infections.¹⁷ Our study's findings indicate that the prevalence of viral upper respiratory tract infections was 20.9% (n=4669), compared to those from studies conducted in Iran (39.5%) and Sao Paulo (27.9%).^{18,19} The majority of patients who come to the emergency

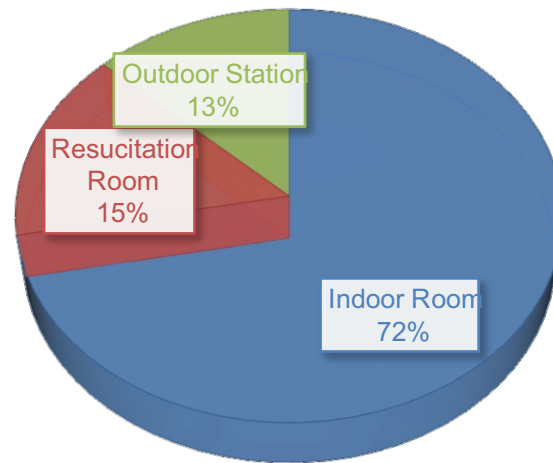


Figure 2. Treatment Settings: Indoor, Resuscitation, and Outdoor Distribution in study population

department of from other nearby hospitals are referred there due to serious conditions, so they need to stay overnight in order to stabilize. As a result, 72% (n=16110) of the study subjects received indoor care, albeit it might only be for a few hours. Hospitalization is required depending on the severity of respiratory infections. Infections and co-infections have a greater potential to cause severe illnesses in younger children, but as exposure rises with age, the severity of the consequences decreases, leading to a higher incidence of hospitalization or inpatient treatment for children compared to adults. Thus, our findings are in line with previous research.²⁰⁻²²

These findings align with existing research on pediatric respiratory illnesses in developing countries, emphasizing the global burden of these diseases. The study's strength lies in its diverse sample and focus on a specific region, providing valuable insights for public health

planning. Further research should explore the factors contributing to disease variation across different groups and evaluate the effectiveness of existing interventions to improve pediatric respiratory health outcomes.

Conclusion

Our retrospective study investigated trends and prevalence of respiratory infections in pediatric patients. Examining a diverse population, the study revealed significant variations in disease occurrence across groups. Viral URTI emerged as the most common illness, affecting 20.9% of patients, followed by pneumonia (37.3%), bronchiolitis (19.3%), and wheezy child (5.3%). These findings emphasize the need for targeted public health interventions and prioritize research on prevalent diseases like pneumonia. Notably, the Chi-Square

statistic of 210.00 with a p-value of 0.2344 and 196 degrees of freedom indicates no significant association between the disease and the frequency of occurrence. This suggests that the observed differences in disease frequencies are likely due to chance. By addressing the specific needs of diverse pediatric populations, we can work towards lowering the burden of respiratory illnesses and ensure healthy childhoods for all.

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